

NTJD4001N, NVTJD4001N

Small Signal MOSFET

30 V, 250 mA, Dual N-Channel, SC-88

Features

- Low Gate Charge for Fast Switching
- Small Footprint – 30% Smaller than TSOP-6
- ESD Protected Gate
- AEC Q101 Qualified – NVTJD4001N
- These Devices are Pb-Free and are RoHS Compliant

Applications

- Low Side Load Switch
- Li-Ion Battery Supplied Devices – Cell Phones, PDAs, DSC
- Buck Converters
- Level Shifts

MAXIMUM RATINGS ($T_J = 25^\circ\text{C}$ unless otherwise stated)

| Parameter | | | Symbol | Value | Units |
|---|--------------|------------------------|-----------------------------------|------------|-------|
| Drain-to-Source Voltage | | | V _{DSS} | 30 | V |
| Gate-to-Source Voltage | | | V _{GS} | ±20 | V |
| Continuous Drain Current (Note 1) | Steady State | T _A = 25 °C | I _D | 250 | mA |
| | | T _A = 85 °C | | 180 | |
| Power Dissipation (Note 1) | Steady State | T _A = 25 °C | P _D | 272 | mW |
| Pulsed Drain Current | | t = 10 μs | I _{DM} | 600 | mA |
| Operating Junction and Storage Temperature | | | T _J , T _{STG} | -55 to 150 | °C |
| Source Current (Body Diode) | | | I _S | 250 | mA |
| Lead Temperature for Soldering Purposes (1/8" from case for 10 s) | | | T _L | 260 | °C |

Stresses exceeding Maximum Ratings may damage the device. Maximum Ratings are stress ratings only. Functional operation above the Recommended Operating Conditions is not implied. Extended exposure to stresses above the Recommended Operating Conditions may affect device reliability.

1. Surface mounted on FR4 board using min pad size (Cu area = 0.155 in sq [1 oz] including traces).

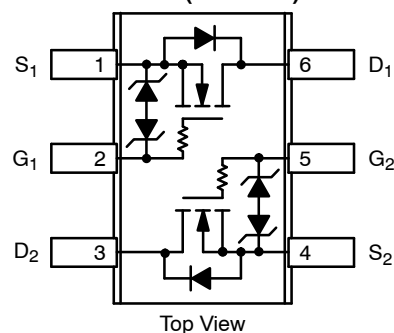


ON Semiconductor®

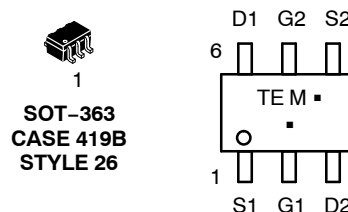
<http://onsemi.com>

| $V_{(BR)DS}$ | $R_{DS(on)}$ TYP | I_D Max |
|--------------|----------------------|-----------|
| 30 V | 1.0 Ω @ 4.0 V | 250 mA |
| | 1.5 Ω @ 2.5 V | |

SOT-363
SC-88 (6 LEADS)



MARKING DIAGRAM & PIN ASSIGNMENT



TE = Device Code
M = Date Code
▪ = Pb-Free Package

(Note: Microdot may be in either location)

ORDERING INFORMATION

| Device | Package | Shipping† |
|---------------|-------------------|--------------------|
| NTJD4001NT1G | SOT-363 (Pb-Free) | 3000 / Tape & Reel |
| NVTJD4001NT1G | SOT-363 (Pb-Free) | 3000 / Tape & Reel |

†For information on tape and reel specifications, including part orientation and tape sizes, please refer to our Tape and Reel Packaging Specification Brochure, BRD8011/D.

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ELECTRICAL CHARACTERISTICS (T_J = 25°C unless otherwise stated)

| Parameter | Symbol | Test Condition | Min | Typ | Max | Unit |
|-----------|--------|----------------|-----|-----|-----|------|
|-----------|--------|----------------|-----|-----|-----|------|

OFF CHARACTERISTICS

| | | | | | | |
|---|--------------------------------------|--|----|----|------|-------|
| Drain-to-Source Breakdown Voltage | V _{(BR)DSS} | V _{GS} = 0 V, I _D = 100 μA | 30 | | | V |
| Drain-to-Source Breakdown Voltage Temperature Coefficient | V _{(BR)DSS} /T _J | | | 56 | | mV/°C |
| Zero Gate Voltage Drain Current | I _{DSS} | V _{GS} = 0 V, V _{DS} = 30 V | | | 1.0 | μA |
| Gate-to-Source Leakage Current | I _{GSS} | V _{DS} = 0 V, V _{GS} = ±10 V | | | ±1.0 | μA |

ON CHARACTERISTICS (Note 2)

| | | | | | | |
|--|-------------------------------------|---|-----|------|-----|-------|
| Gate Threshold Voltage | V _{GS(TH)} | V _{GS} = V _{DS} , I _D = 100 μA | 0.8 | 1.2 | 1.5 | V |
| Gate Threshold Temperature Coefficient | V _{GS(TH)} /T _J | | | -3.2 | | mV/°C |
| Drain-to-Source On Resistance | R _{DS(on)} | V _{GS} = 4.0 V, I _D = 10 mA | | 1.0 | 1.5 | Ω |
| | | V _{GS} = 2.5 V, I _D = 10 mA | | 1.5 | 2.5 | |
| Forward Transconductance | g _{FS} | V _{DS} = 3.0 V, I _D = 10 mA | | 80 | | mS |

CHARGES AND CAPACITANCES

| | | | | | | |
|------------------------------|---------------------|--|--|------|-----|----|
| Input Capacitance | C _{ISS} | V _{GS} = 0 V, f = 1.0 MHz, V _{DS} = 5.0 V | | 20 | 33 | pF |
| Output Capacitance | C _{OSS} | | | 19 | 32 | |
| Reverse Transfer Capacitance | C _{RSS} | | | 7.25 | 12 | |
| Total Gate Charge | Q _{G(TOT)} | V _{GS} = 5.0 V, V _{DS} = 24 V, I _D = 0.1 A | | 0.9 | 1.3 | nC |
| Threshold Gate Charge | Q _{G(TH)} | | | 0.2 | | |
| Gate-to-Source Charge | Q _{GS} | | | 0.3 | | |
| Gate-to-Drain Charge | Q _{GD} | | | 0.2 | | |

SWITCHING CHARACTERISTICS (Note 3)

| | | | | | | |
|---------------------|---------------------|--|--|----|--|----|
| Turn-On Delay Time | t _{d(ON)} | V _{GS} = 4.5 V, V _{DD} = 5.0 V, I _D = 10 mA, R _G = 50 Ω | | 17 | | ns |
| Rise Time | t _r | | | 23 | | |
| Turn-Off Delay Time | t _{d(OFF)} | | | 94 | | |
| Fall Time | t _f | | | 82 | | |

DRAIN-SOURCE DIODE CHARACTERISTICS

| | | | | | | | |
|-----------------------|-----------------|--|------------------------|--|------|-----|----|
| Forward Diode Voltage | V _{SD} | V _{GS} = 0 V, I _S = 10 mA | T _J = 25°C | | 0.65 | 0.7 | V |
| | | | T _J = 125°C | | 0.45 | | |
| Reverse Recovery Time | t _{RR} | V _{GS} = 0 V, dI _S /dt = 8.0 A/μs, I _S = 10 mA | | | 12.4 | | ns |

- Pulse Test: pulse width ≤ 300 μs, duty cycle ≤ 2%.
- Switching characteristics are independent of operating junction temperatures.

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TYPICAL PERFORMANCE CURVES ($T_J = 25^\circ\text{C}$ unless otherwise noted)

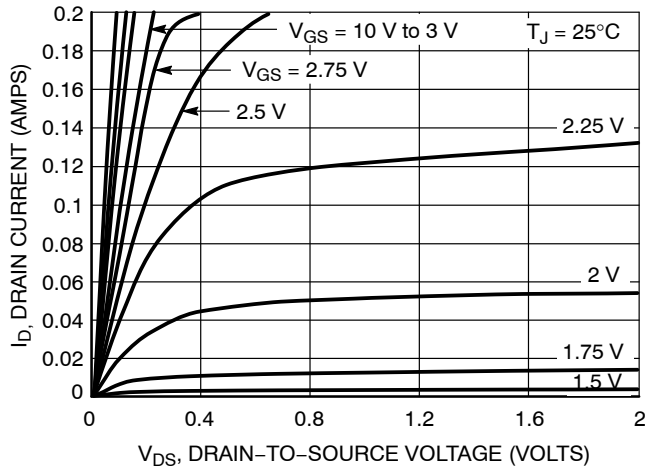


Figure 1. On-Region Characteristics

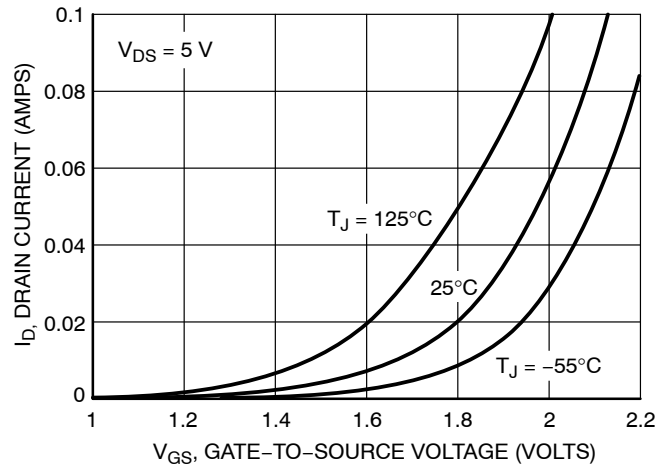


Figure 2. Transfer Characteristics

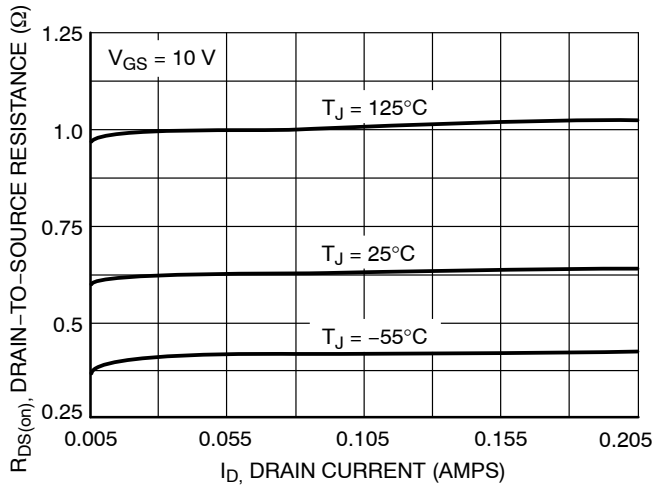


Figure 3. On-Resistance vs. Drain Current and Temperature

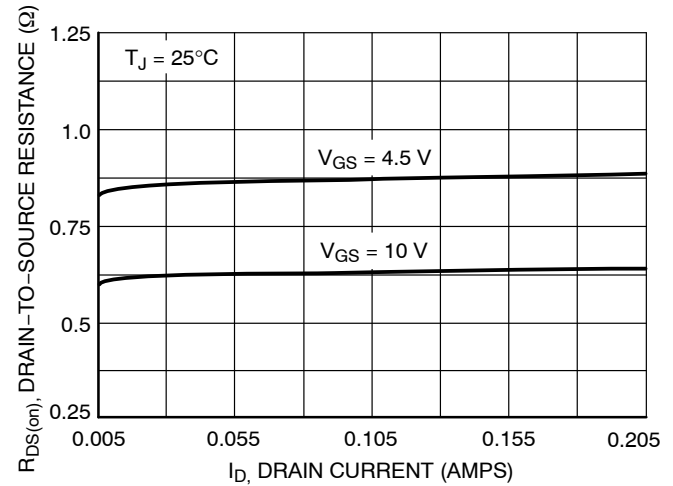


Figure 4. On-Resistance vs. Drain Current and Gate Voltage

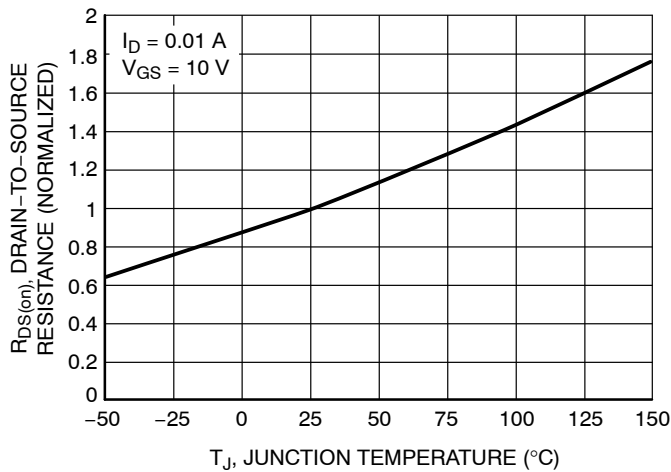


Figure 5. On-Resistance Variation with Temperature

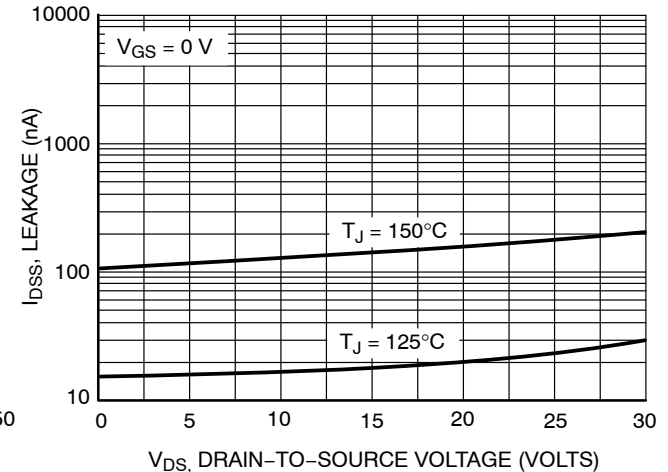


Figure 6. Drain-to-Source Leakage Current vs. Voltage

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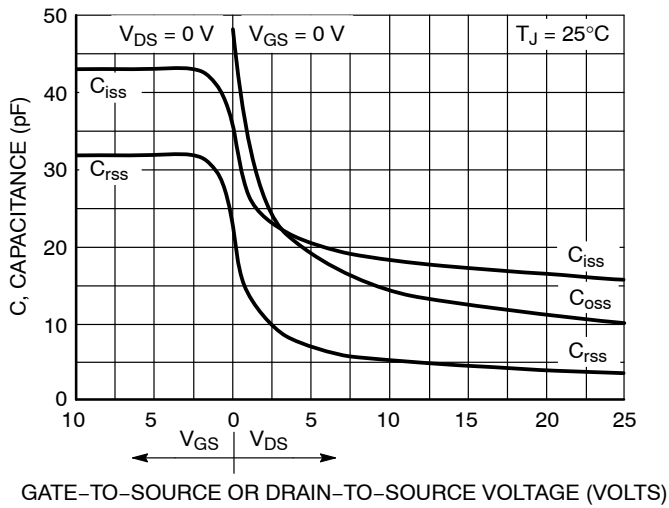


Figure 7. Capacitance Variation

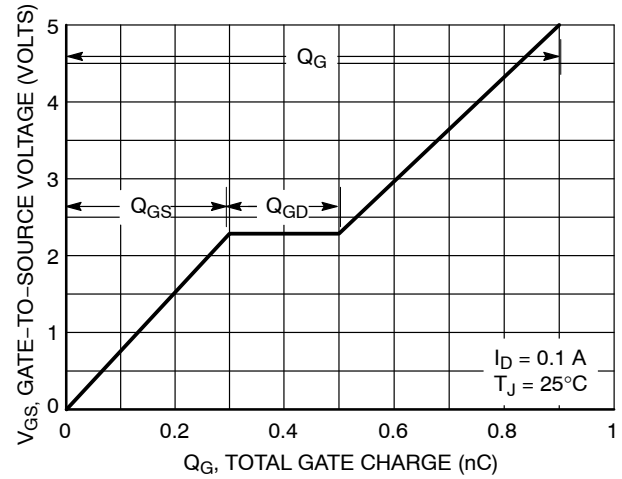


Figure 8. Gate-to-Source Voltage vs. Total Gate Charge

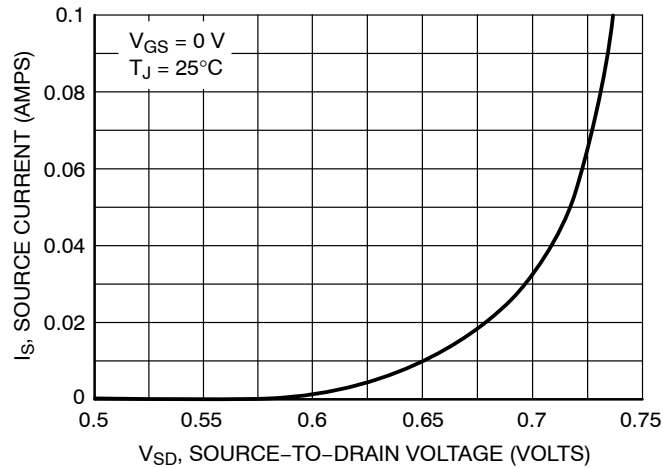


Figure 9. Diode Forward Voltage vs. Current

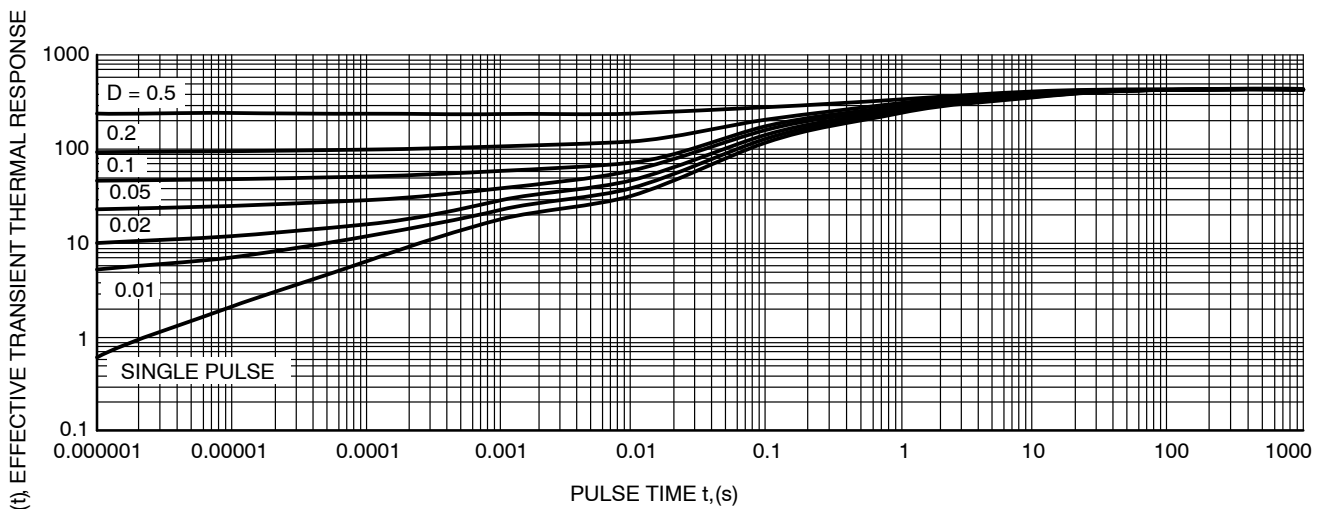


Figure 10. Thermal Response

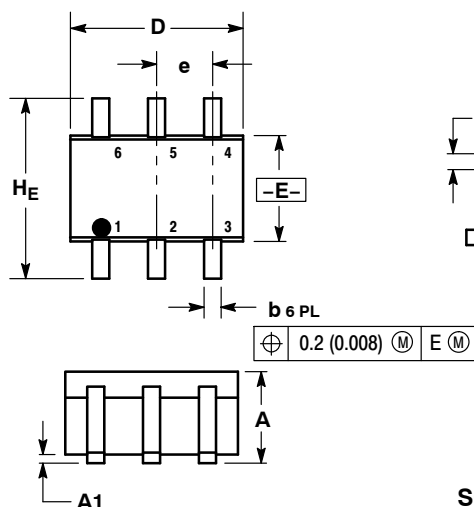
NTJD4001N, NVTJD4001N

PACKAGE DIMENSIONS

SC-88/SC70-6/SOT-363

CASE 419B-02

ISSUE W



NOTES:

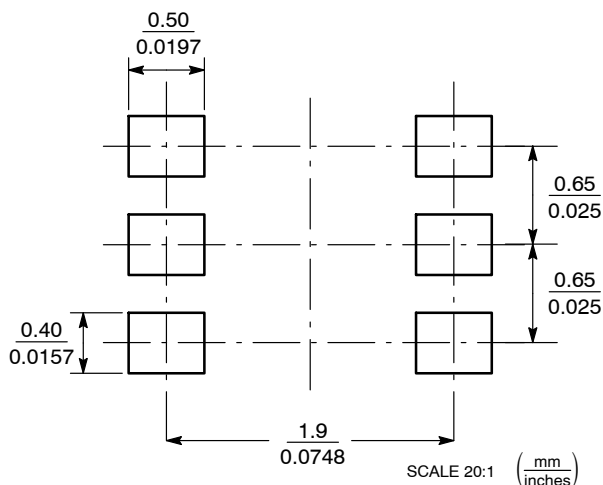
1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.
2. CONTROLLING DIMENSION: INCH.
3. 419B-01 OBSOLETE, NEW STANDARD 419B-02.

| DIM | MILLIMETERS | | | INCHES | | |
|----------------|-------------|------|------|-----------|-------|-------|
| | MIN | NOM | MAX | MIN | NOM | MAX |
| A | 0.80 | 0.95 | 1.10 | 0.031 | 0.037 | 0.043 |
| A1 | 0.00 | 0.05 | 0.10 | 0.000 | 0.002 | 0.004 |
| A3 | 0.20 REF | | | 0.008 REF | | |
| b | 0.10 | 0.21 | 0.30 | 0.004 | 0.008 | 0.012 |
| C | 0.10 | 0.14 | 0.25 | 0.004 | 0.005 | 0.010 |
| D | 1.80 | 2.00 | 2.20 | 0.070 | 0.078 | 0.086 |
| E | 1.15 | 1.25 | 1.35 | 0.045 | 0.049 | 0.053 |
| e | 0.65 BSC | | | 0.026 BSC | | |
| L | 0.10 | 0.20 | 0.30 | 0.004 | 0.008 | 0.012 |
| H _E | 2.00 | 2.10 | 2.20 | 0.078 | 0.082 | 0.086 |

STYLE 26:

- PIN 1. SOURCE 1
2. GATE 1
3. DRAIN 2
4. SOURCE 2
5. GATE 2
6. DRAIN 1

SOLDERING FOOTPRINT*



*For additional information on our Pb-Free strategy and soldering details, please download the ON Semiconductor Soldering and Mounting Techniques Reference Manual, SOLDERRM/D.

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